

## CLAIMS

### WHAT IS CLAIMED IS:

1. A method for identifying a compound as a candidate for a herbicide, comprising:
  - a) contacting a DET2 with a compound; and
  - b) detecting the presence and/or absence of binding between said compound and said DET2, wherein binding indicates that said compound is a candidate for a herbicide.
2. The method of claim 1, wherein said DET2 is a plant DET2.
3. The method of claim 2, wherein said DET2 is an *Arabidopsis* DET2.
4. The method of claim 3, wherein said DET2 is SEQ ID NO:2.
5. A method for determining whether a compound identified as a herbicide candidate by the method of claim 1 has herbicidal activity, comprising: contacting a plant or plant cells with said herbicide candidate and detecting the presence or absence of a decrease in growth or viability of said plant or plant cells.
6. A method for identifying a compound as a candidate for a herbicide, comprising:
  - a) contacting a compound with at least one polypeptide selected from the group consisting of: an amino acid sequence comprising at least ten consecutive amino acids of a plant DET2, an amino acid sequence having at least 85% sequence identity with a plant DET2, and an amino acid sequence having at least 80% sequence identity with a plant DET2 and at least 50% of the activity thereof; and
  - b) detecting the presence and/or absence of binding between said compound and said polypeptide, wherein binding indicates that said compound is a candidate for a herbicide.

7. A method for determining whether a compound identified as a herbicide candidate by the method of claim 6 has herbicidal activity, comprising: contacting a plant or plant cells with said herbicide candidate and detecting the presence or absence of a decrease in growth or viability of said plant or plant cells.
8. A method for identifying a compound as a candidate for a herbicide, comprising:
- a) contacting a (24R)-24-methylcholest-4-en-3-one with DET2;
  - b) contacting said (24R)-24-methylcholest-4-en-3-one with DET2 and a candidate compound; and
  - c) determining the concentration of at least one of (24R)-24-methylcholest-4-en-3-one, and/or (24R)-24-methyl-5alpha-cholestan-3-one after the contacting of steps (a) and (b).
9. The method of claim 8, wherein said DET2 is a plant DET2.
10. The method of claim 9, wherein said DET2 is an *Arabidopsis* DET2.
11. The method of claim 10, wherein said DET2 is SEQ ID NO:2.
12. A method for identifying a compound as a candidate for a herbicide, comprising:
- a) contacting (24R)-24-methylcholest-4-en-3-one with a polypeptide selected from the group consisting of: a polypeptide having at least 85% sequence identity with a plant DET2, a polypeptide having at least 80% sequence identity with a plant DET2 and at least 50% of the activity thereof, and a polypeptide comprising at least 100 consecutive amino acids of a plant DET2;
  - b) contacting said (24R)-24-methylcholest-4-en-3-one with said polypeptide and said compound; and
  - c) determining the concentration of at least one of (24R)-24-methylcholest-4-en-3-one, and/or (24R)-24-methyl-5alpha-cholestan-3-one after the contacting of steps (a) and (b).

13. A method for identifying a compound as a candidate for a herbicide, comprising:
- a) measuring the expression of a DET2 in a plant or plant cell in the absence of a compound;
  - b) contacting a plant or plant cell with said compound and measuring the expression of said DET2 in said plant or plant cell;
  - c) comparing the expression of DET2 in steps (a) and (b).
14. The method of claim 13 wherein said plant or plant cell is an *Arabidopsis* plant or plant cell.
15. The method of claim 14, wherein said DET2 is SEQ ID NO:2.
16. The method of claim 13, wherein the expression of DET2 is measured by detecting DET2 mRNA.
17. The method of claim 13, wherein the expression of DET2 is measured by detecting DET2 polypeptide.